

PATENT SPECIFICATION



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232,870

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COMPLETE SPECIFICATION.

Improvements in or relating to Fire-escapes or Mechanical Ladders.

I, JOSEPH CHATWIN, of British nationality, of 253, Gray's Inn Road, London, W.C. 1, do hereby declare the nature of this invention, which has been communicated to me by C. D. Magirus Aktiengesellschaft, a Joint Stock Company, organised under the laws of Germany, of 2, Schillerstrasse, Ulm, Germany, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

In mechanical fire-escapes it is known to pivot the ladder about a pin perpendicular to the plane thereof by means of an axially displaceable spindle nut in order to prevent the upsetting of the ladder when extended due to unevenness of the ground surface.

With the use of a power drive for the spindle there is a danger of damaging or smashing the driving gear if the spindle nut has reached its end position and the drive is not shut off at the correct time.

According to the invention a device to switch over the spindle which is in itself known serves to prevent such injury, the operation of which can be effected and observed from the foot of the ladder. It may happen that the ladder must be used out of the perpendicular, for example, in a strong side wind or for placing against a window. It is therefore an advantage if the fireman who has to mount the escape can effect the adjustment of the perpendicular position by pivoting the ladder about the abovementioned turning point from his stand at the foot of the ladder independently of the attendant of the main driving engine of the machine. For this purpose it is only necessary to

operate a switch lever in order to bring in the power drive, or a hand wheel for adjusting by hand. In both cases, a spindle rotatably mounted in the outer end of the erecting frame is set in rotation and the slide block guided in the foot of the ladder and identical with the spindle nut is so displaced that according to the direction of rotation of the spindle it effects a pivoting of the ladder about the pin lying perpendicular to the plane of the ladder and an adjustment of the latter to the left or right. The stroke or amount of displacement of the spindle nut on its spindle is limited on both sides, to the left and to the right in known manner by abutment pieces which according to the invention are so connected together that on coming to the end of its run the spindle nut effects a longitudinal movement thereof whereby an automatic throwing out of gear of the spindle drive results. Thus injury to the driving parts by the power drive is prevented. The throwing in or out of gear of the driving apparatus is effected through the intermediary of two oppositely disposed bevel driving surfaces i.e. friction or tooth wheels, which are secured upon a sleeve keyed upon the spindle so as to be axially displaceable thereon or these may be formed in one piece and moved into or out of engagement with a friction or tooth bevel wheel journaled therebetween. This bevel wheel has always the same direction of rotation and is driven on the main drive of the escape by suitable means, e.g. by intermediate driving shafts. According as the one or other bevel wheel may come into engagement with the bevel wheel journaled therebetween the spindle is rotated to left or right and effects similar displacement of the

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spindle nut and therewith the foot of the ladder. The engagement or disengagement of the bevel wheels is effected by means of a hand lever which moves the sleeve of the bevel wheels feathered upon the spindle. The connection between the abutment pieces for the spindle nut may be by means of a sleeve surrounding the spindle nut or merely a rod; it is only necessary that the movement of either abutment piece is transmitted to the other and at the same time to the sleeve of the bevel wheels.

The invention is illustrated in the accompanying drawings which by way of example show the use thereof with a displaceable spindle end, and in which;

Fig. 1 shows the safety driving mechanism in side elevation;

Fig. 2 is a plan view of the mechanism shown in Fig. 1 with the parts of the escape appertaining thereto;

Fig. 3 shows the steering guide secured to the foot of the escape with slide block and spindle nut in section with parts in elevation, and.

Fig. 4 shows in plan view the guiding of the slide block in the position when the escape is swung out.

The frame A rotatably mounted on the truck (not shown) carries upon an axle b^1 rotatable in a bearing a^1 the escape erecting frame B. In its centre line is provided in known manner the pin b^2 perpendicular to the plane of the escape, about which the escape or ladder C is rotatable. Its rear end is guided in an arcuate guide b^3 of the erecting frame B. The latter carries at its rear end in a bearing b^4 secured against axial displacement, the spindle D of a spindle end clutch device in itself known. To the feet of the escape C is secured a plate C^2 , which in the centre possesses a rectangular slot C^3 in which a slide block C^4 is guided in the longitudinal direction of the escape. The block is carried upon a spigot C^5 of a spindle nut C^1 the displacement of which is thereby transmitted to the end of the escape and effects a swinging of the escape or ladder about the pivot pin b^2 .

At both ends of the spindle D upon turned portions thereof are mounted abutment pieces m^1 , m^2 which are connected together by a casing M around the spindle nut. At one end of this casing is keyed with sliding feather upon the spindle D, the hub or transmission sleeve of friction or bevel wheels K^1 , K^2 , the end of the casing M is journaled on said hub but cannot move longitudinally thereto, so that a displacement of one or other abutment pieces m^1 , m^2 is transmitted by the casing M to the bevel

wheels K^1 , K^2 . The bevel wheels K^1 , K^2 can however also be displaced by a hand lever L which engages the hub of said bevel wheels by means of a collar as is common practice in clutch mechanism.

Between the bevel wheels K^1 , K^2 is positioned a friction or bevel gear wheel J^1 which is adapted to be rotated by the truck motor through the intermediary of driving shaft F and intermediate gears E, G, H, J, always in the same direction.

After the erection of the ladder the frame B thereof takes the position indicated by dotted lines in Fig. 1. If the escape stands slanting in consequence of the unevenness of the ground, so that it hangs over, it is brought upright into the vertical by pivoting in its plane i.e. by suitably turning it about the pivot pin b^2 , in order to prevent an upsetting of the apparatus. This erection is effected independently of the attendant of the truck motor from the foot of the ladder by the fireman who has to mount the escape. He can observe the position of the escape from his place at the foot of the ladder better than the motor attendant. Suppose the ladder hangs with its upper end over towards the right, this end must be adjusted towards the left, wherefor the foot end must be pushed to the right. In this case the hand lever L is moved to the left so that the operative surface of the bevel wheel K^1 comes in contact with the bevel wheel J^1 and thereby the spindle D is set in rotation in such direction that the spindle nut C^1 is displaced. It thereby results that the lower ladder portion occupies the position shown by dot-dash lines in Fig. 2.

If this driving continues until the spindle nut C^1 strikes against the abutment piece m^1 , then it pushes this also to the right and therewith the casing M and the hub or sleeve of the bevel wheels K^1 , K^2 in the same direction so that now the driving face of the bevel wheel K^1 becomes out of engagement with the bevel wheel J^1 , the spindle D thereupon comes to rest and injury to the driving mechanism is thereby prevented. It will be understood that the spigot C^5 of the nut C^1 passes through a longitudinal slot in the casing M and thus prevents the latter from rotating.

The spindle D can also be directly set in rotation in the desired manner independently of the power drive by operation of the hand wheels d^1 , d^2 in one or other direction, and the ladder thereby adjusted to the perpendicular.

Having now particularly described and

ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Safety driving mechanism for adjusting mechanical ladders laterally in the plane of the ladder, for which purpose the ladder is pivotal about a pin perpendicular to its plane, characterised by two abutment pieces (m^1 , m^2) displaceable axially of a spindle (D) one or other of which pieces is adapted to be struck by a spindle nut (C^1) which effects traverse of the ladder and which are connected by a casing (M) or the like, which upon being operated transmits its movement to oppositely arranged bevel wheels K^1 , K^2 adapted to engage with the driving spindle bevel wheel (J) lying therebetween.
2. Safety driving mechanism according to Claim 1, characterised in that the throwing in or out of action of the spindle (D) is effected by a hand lever (L) which causes a longitudinal movement of the double drive (K^1 , K^2) upon the spindle and thereby produces the engagement or disengagement of a driving bevel

wheel (J^1) with one or other driving surface of the double drive.

3. Safety driving mechanism according to Claims 1 and 2, characterised in that in the disengaged condition of the double drive (K^1 , K^2) the rotation of the ladder adjusting spindle (D) can be effected by hand wheels (d^1 , d^2) secured thereto.

4. Safety driving mechanism according to Claims 1 to 3, characterised in that the double drive (K^1 , K^2) longitudinally displaceable upon the ladder adjusting spindle (D) is rotatably connected by its hub with a casing (M) which carries the abutment pieces (m^1 , m^2) and serves to protect these abutment pieces as well as the spindle and spindle nut.

5. Safety driving mechanism for adjusting mechanical ladders, substantially as described with reference to and as illustrated by the accompanying drawings.

Dated this 28th day of October, 1924.
CHATWIN & COMPANY,
253, Gray's Inn Road, London, W.C. 1,
Patent Agents for the Applicant.

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[This Drawing is a reproduction of the Original on a reduced scale.]

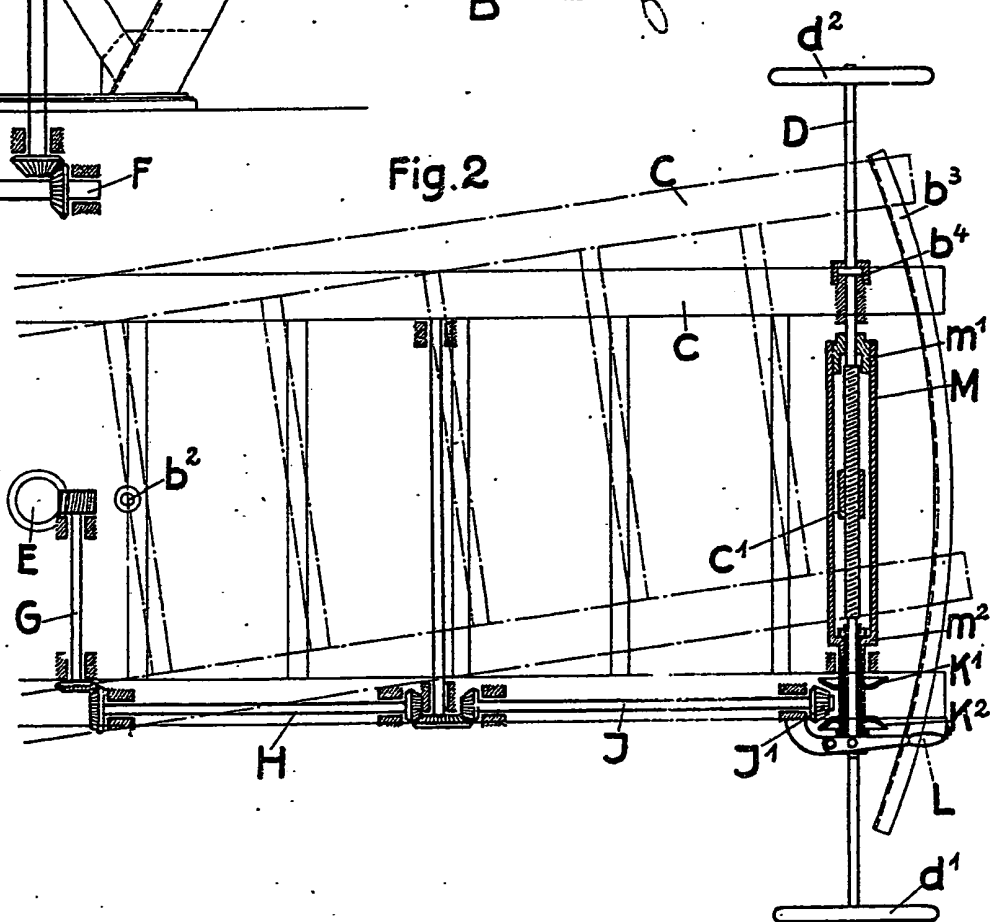
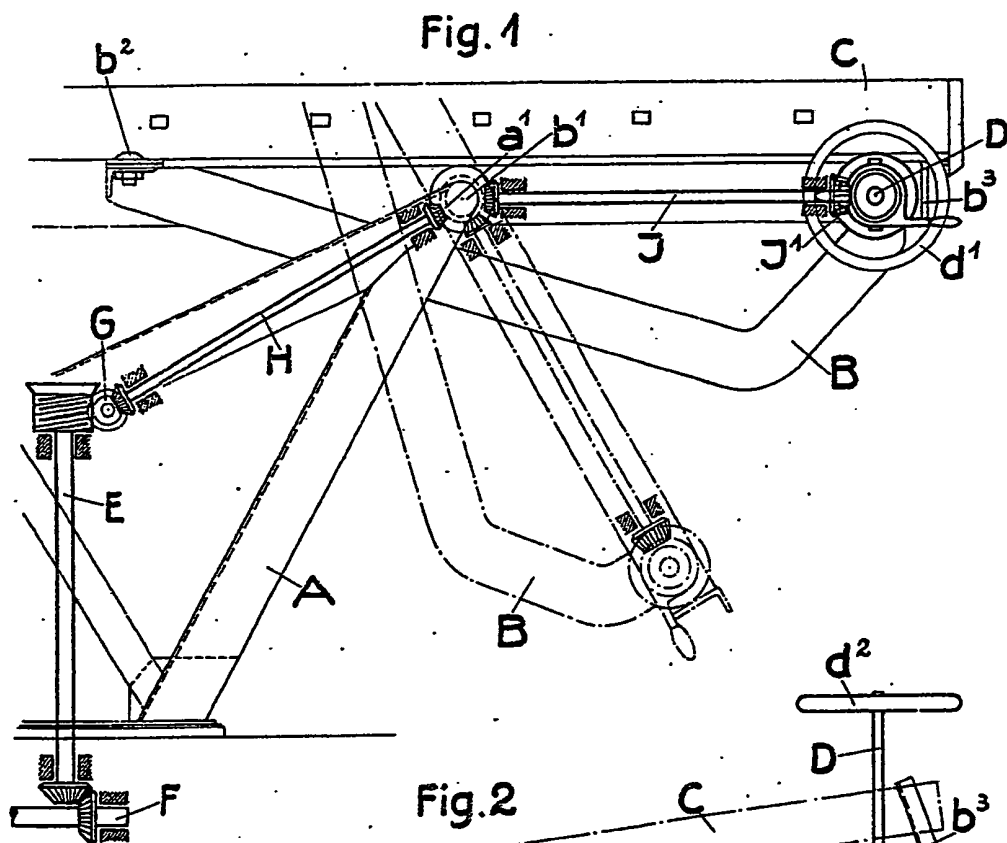


Fig. 3

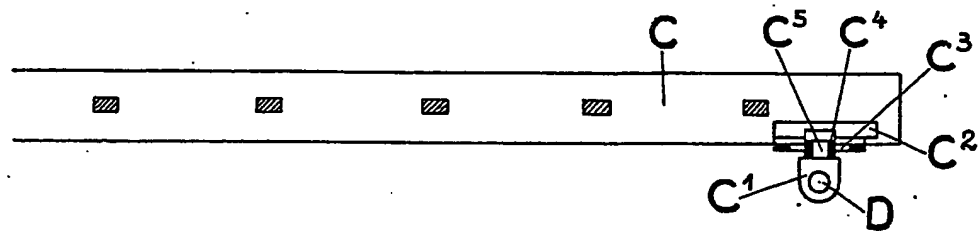
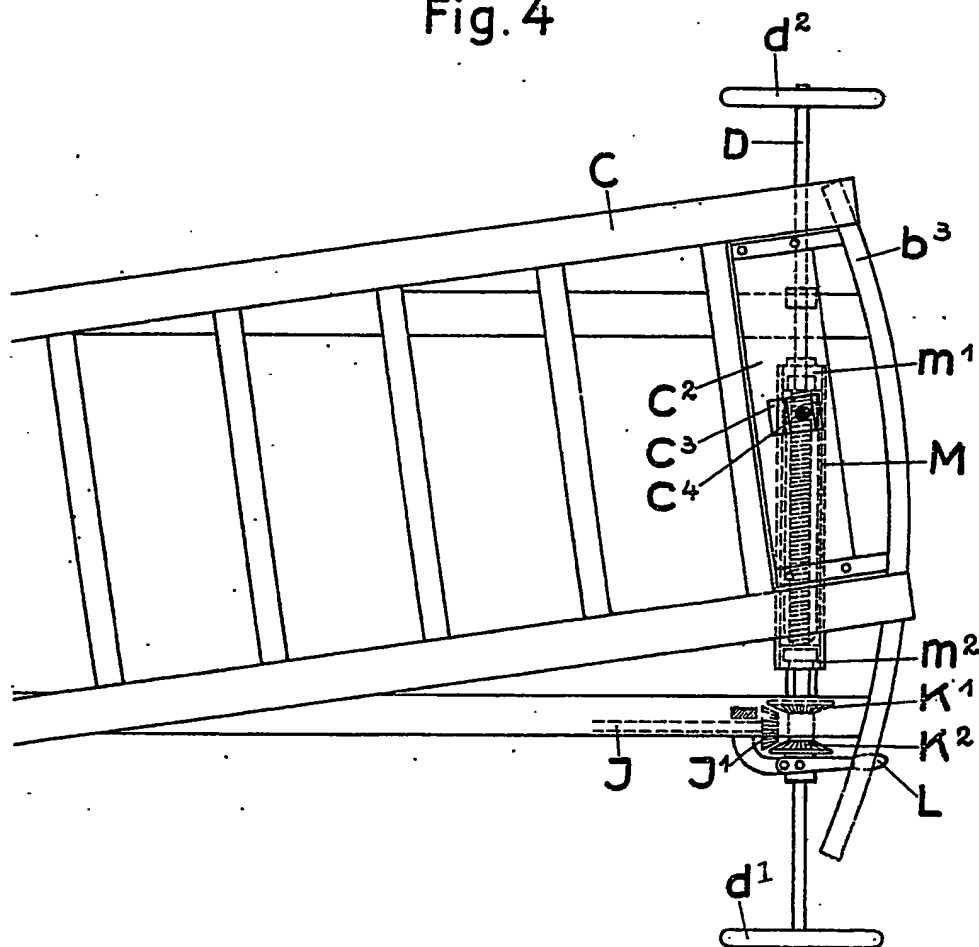


Fig. 4



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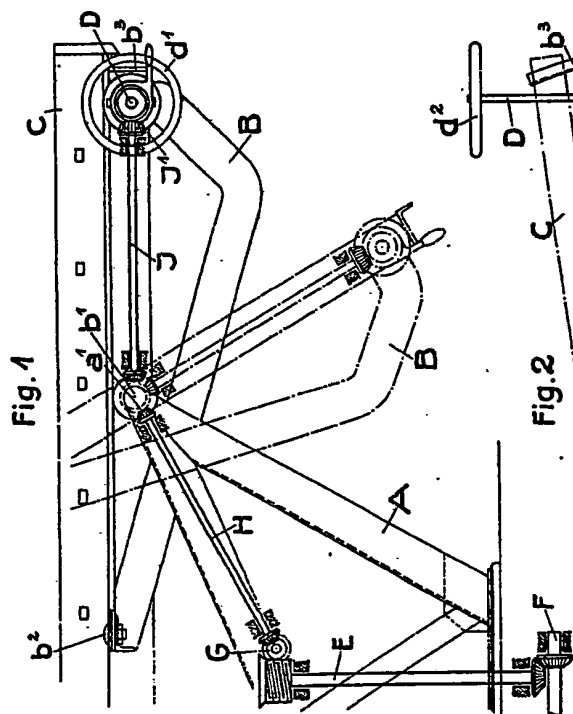


Fig. 1

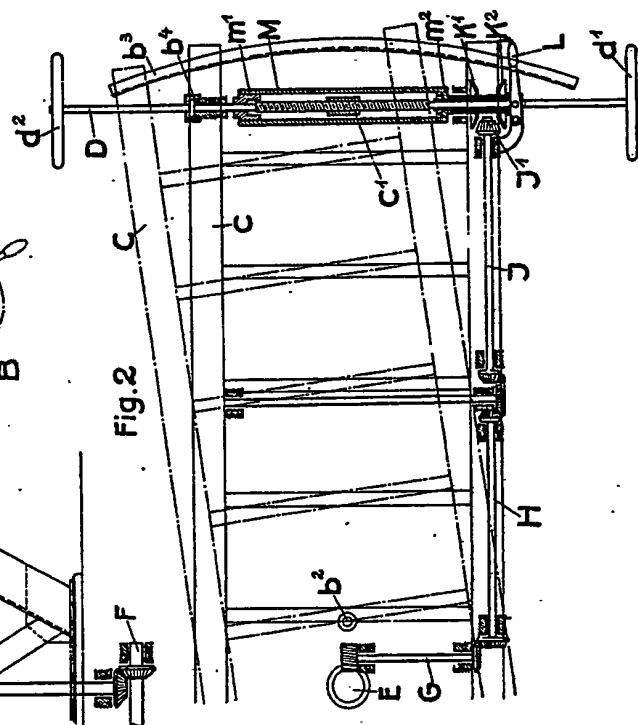


Fig. 2

Fig. 3

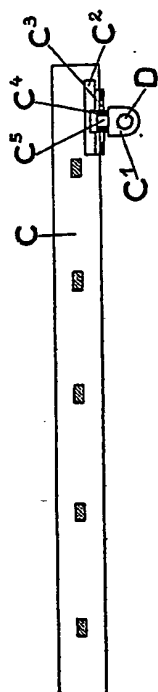
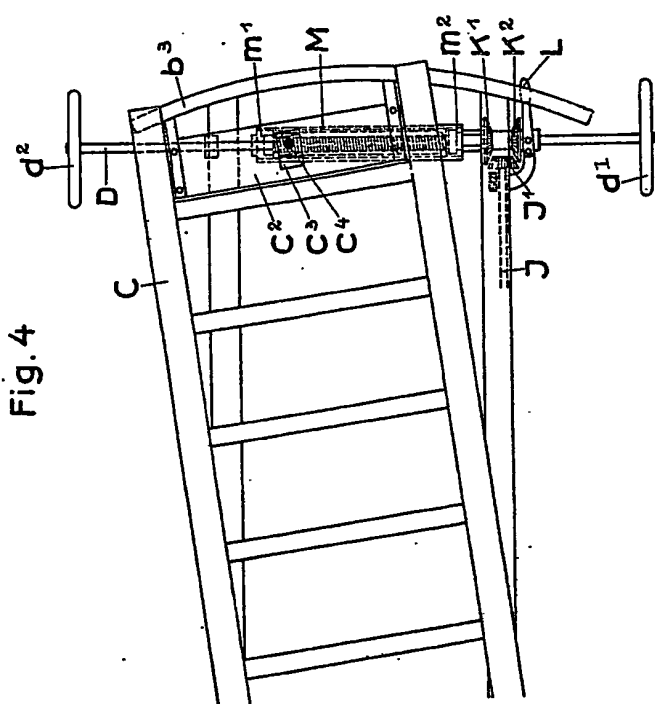


Fig. 4



[This Drawing is a reproduction of the Original on a reduced scale]